SECTION 11 -- SYNCHRONIZATION

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TABLE 11-1 – SUMMARY OF CHANGES IN SECTION 11

Revision Date	Item	Action	Requirements Change Notification
10/1/2013	2.3.3	Modification	ATT-TP-76400-096
11/7/2014	2.7	Modification	ATT-TP-76400-127

1. GENERAL

1.1. Introduction

1.1.1 This section has been prepared to provide general guidelines necessary to assure compliance with the AT&T synchronization rules and policies.

1.1.2 Changes in this issue of Section 11 are summarized in Table 11-1.

1.1.3 Building Integrated Timing Supply (BITS) concept is AT&T's method of providing and sustaining intraoffice synchronization. The BITS plan specifies that each office shall have one master clock signal source called the BITS/TSG (TSG = Timing Signal Generator). Under the BITS concept, every externally timed digital Network Element (NE) in the office shall derive its timing DIRECTLY from that single source within that office. A timing capable Network Element is defined as any digital equipment piece that is able to conform to the BITS

concept by accepting timing signals from an external source. A Network Element is still timing capable although it may not be currently configured or equipped to accept external timing signals, but the option exists to allow it to be so equipped.

2. SYNCHRONIZATION REQUIREMENTS

2.1. General

2.1.1 The minimum acceptable stratum level for any/all office master BITS clock is stratum 3E (ST3E). A master TSG shelf is that one shelf in each Carrier Communications Space that houses the redundant ST3E/ST2 (E) master oscillators, is redundantly DS-1 signal fed has PRS-traceability, New shelves placed as office master shall also have TL1 interoperability.

2.1.2 Each Carrier Communications Space meeting any of the following conditions or qualifying under any of the categories must be modified to comply with BITS:

a) An office with a digital switch (host or stand alone) or a digital switch remote that is external timing capable;

b) An office with a SONET network element;

c) An office with at least three independent timing capable digital network pieces of equipment.

2.1.3 For non-Carrier Communications Space locations (i.e., mini/maxi huts, CEVs, etc.) there may be the need for a BITS clock to provide timing signals to: interconnecting rings; locations with three independent pieces of timing capable digital equipment; and locations with multiple synchronous elements. Contact the AT&T sync equipment planner when these conditions occur.

2.1.4 All externally timed network elements within a building shall derive timing input signals directly from a BITS/TSG.

2.1.5 Any Network Primary Reference Supply (PRS) shelf must be in the same bay or an adjacent bay to the master shelf. When a PRS is installed, the master shelf must be converted to the shelf that meets the master clock definition and be equipped with Stratum 2(E) oscillators.

2.2. Diversity

2.2.1 Effective 1-1-2012, there are no diversity requirements for routing timing cables on overhead cable racks, under raised floor installations, or for routing PTP/NTP fiber jumpers in fiber troughs .

2.3. Engineering Requirements For BITS

2.3.1 Operationally, the BITS equipment shall be located in a low traffic area near the majority of Network Elements that it serves.

2.3.2 A dedicated bay shall be provided for the BITS equipment.

2.3.3 DS1 and composite clock timing leads from BITS clock OUTPUT ports to a network element shall be run using the approved 1175A red-jacketed shielded cable. Red jacketed 735C

coaxial cable shall be used for 2048 kHz analog sync signals. Single mode fiber jumpers or category 5e (or higher) unshielded Ethernet cable shall be used for Precision Time Protocol and Network Time Protocol timing signals as specified by the sync equipment planner.

2.3.4 Timing signal leads from the BITS clock OUTPUT ports to network element inputs shall NOT be run through DSX jacks unless instructed to do so by the AT&T sync equipment planner.

2.3.5 The 1175A timing cable shield/drain wire shall be DC/hard grounded at the clock end only. The shield/drain wire shall NOT be DC/hard grounded at the Network Element. The shield drain ground wire of the 1175A cable shall be insulated with spaghetti sleeve.

2.3.6 All critical network element timing leads shall originate from BITS/TSG shelves that have phase holdover capabilities. This includes expansion shelves associated with the Master shelf or Remote Master shelf that are equipped with Remote Track and Hold Cards (RTHC) or oscillators capable of phase holdover. The AT&T sync equipment planner shall be notified when this is not possible. This applies to existing installations as well as new ones. Examples of Critical network elements include:

a) All CCS7 related equipment (STPs, LPPs, LIMs, FLIS, ACCESS7 and D4 bays serving SS7 Links).

b) All Remote Master Clock (Slave) Shelves

c) Any other equipment specified by the AT&T sync equipment planner as being “critical”.

2.3.7 All timing signal output cards shall be deployed in adjacent mated pairs (odd & even assignments within a DCD shelf) alternate card assignments. Outputs shall be equally assigned in matched sets of cards such that both card sets will exhaust at the same time period. Output timing signal feeds shall be routed from alternate sides of the BITS shelf. The Detail Engineering Service Provider (DESP) shall not change existing wiring arrangements of the BITS shelf without approval of the AT& sync equipment planner.

2.3.8 BITS record books shall be maintained only where they currently exist. BITS record books shall not be created for locations for which they do not currently exist. Where BITS record books are maintained, the DESP shall provide the BITS record book, record book holder and assure all assignments accurately match in the regionally approved record keeping system (ex. TAB/dB, SyncTrac, or GeoLink).

2.3.9 When directed to do so, the DESP shall specify that the discrete, visual and audible alarm and alarm return leads be run as a pair and terminated per ATT 801-601-900 and ATT-TP-76450.

2.4. Timing Reference Inputs

2.4.1 The AT&T sync equipment planner will provide for timing reference input signals. Wiring of the input timing reference shall be in accordance with the appropriate ATT-CO Wiring interconnection drawing. Mini-DSX will be placed only for new master systems that employ SONET Derived DS1 signals as the input timing reference as directed by the sync equipment planner.

2.5. Power Requirements

2.5.1 A dedicated fuse panel shall be a part of each initial BITS installation. If no existing dedicated panel is available, a new dedicated fuse panel shall be provided. This fuse panel may serve BITS equipment in adjacent bay(s) only.

2.5.2 Only BITS or associated BITS equipment located in BITS bays shall be fused by the dedicated fuse panel.

2.5.3 Battery feeders to the BITS fuse panel that originate directly at the Power Plant shall be fused on different rows.

2.5.4 “A” and “B” battery outputs of the fuse panel shall correspond to the “A” and “B” battery inputs of the BITS equipment.

2.5.5 Battery load and battery return connections from the fuse panel to the BITS equipment shall be made with ring terminals at both ends unless the existing fuse panel is designed with mechanical (screw) terminations.

2.6. Grounding Requirements

2.6.1 Clock shelf chassis (frame) ground and logic/signal ground leads shall be individually run and properly terminated.

2.6.2 Timing source signal input leads to a BITS clock from a network element must be AT&T approved 1175A specified cable. If the lead has a DSX appearance, the shield/drain shall be grounded at the network element and the clock, but left un-terminated at the DSX. If the lead does not have a DSX appearance, the shield/drain shall be grounded only at the timing source signal origin.

2.6.3 Where shield/drain ground connections is required, verify that the ground termination pin is a DC-ground and not grounded through an AC-coupled capacitor at the timing source.

2.7. Network Elements

2.7.1 Network element equipment configurations requiring BITS timing shall be individually timed from the office BITS, with primary and secondary reference signals from adjacent output cards, with odd-even or alternate group slot assignments per AT&T interconnect drawings. Timing connections at the network element shall be made per the AT&T interconnect drawings.

2.7.2 In the event of output card exhaustion, daisy-chaining to enable cascading of digital (DS1, CC, E1) synchronization reference signals to multiple network elements is NOT an AT&T option and shall not be permitted. Arrangements must be made with the AT&T synchronization planner to provide additional BITS outputs. This requirement does not apply to serial Time of Day connections when cabled as shown in AT&T interconnect drawings.

2.7.3 Each network element shall have the digital (DS1, CC, E1) “CLOCK IN” connections (PRIMARY and SECONDARY) cabled via 1175A red jacketed timing cable to the BITS. Red jacketed 735C coaxial cable shall be used for analog (2048 kHz) timing signals. Shield lead conductors of all 1175A timing input cables shall be DC-grounded at the BITS shelf wire wrap panel only and left insulated and un-terminated at the network element.

2.7.4 Network element “CLOCK OUT” connections (PRIMARY and SECONDARY) shall not be cabled, except when required for office BITS clock reference input as specified by the AT&T sync equipment planner.

2.8. Removals

2.8.1 All Network Elements that are removed and have timing leads shall have the timing leads disconnected at the BITS.

2.8.2 Complete all cable removal operations, and assure all updates match and are reflected in the regionally approved record keeping system (ex. TAB/db, SyncTrac, or GeoLink). For sites where a BITS record book is maintained, the record book must be updated to match the regionally approved record keeping system.

[END OF SECTION]